

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 92052

CSAH NO. 19

OVER THE

NORTH FORK CROW RIVER

DISTRICT 3 - STERNS COUNTY



PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 3512

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 92052 consisted of the East and West Abutments and Pier 1. The timber components of the substructure units were found to be in satisfactory to fair condition with random checking and outer shell cracking observed on all of the timber piles. All of the timber braces of Pier 1 exhibited up to 15 percent section loss from 1 foot above the waterline to below the waterline. Three of the diagonal braces of the pier were also broken and/or split. The two interior piles of the East Abutment exhibited moderate to heavy decay of the surface layer, exhibiting up to 2 inches of penetration into the piles. A moderate to heavy accumulation of timber debris was observed across the entire upstream fascia of the bridge. The channel bottom around the substructure units consisted of a soft silt and cobbles that appeared to be stable with no significant scour at the time of the inspection.

INSPECTION FINDINGS:

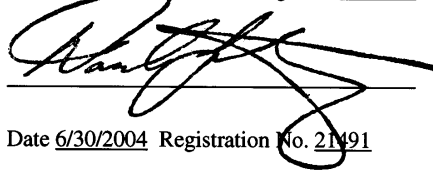
- (A) All of the timber piles exhibited approximately 5 percent section loss near the waterline with up to 1/8 inch wide vertical outer shell cracking extending the full height of the piles and penetrations up to 1/4 inch deep near the waterline.
- (B) Three of the diagonal braces at the pier were broken below the waterline and were no longer engaged to the timber piles.
- (C) The fourth timber pile from the upstream end of the East Abutment exhibited delamination and outer shell cracking from 2 feet above the waterline to the channel bottom with up to 2 inches of penetration.
- (D) A moderate to heavy accumulation of timber debris, consisting of up to 2 foot diameter logs, was observed along the entire upstream fascia.

RECOMMENDATIONS:

- (A) Replace the broken and/or split diagonal braces during future maintenance operations. Monitor the decayed piles at the East Abutment during future inspections, and if found to be progressing, remedial measures may then be warranted.
- (B) Remove the moderate accumulation of timber debris from the upstream fascia of the bridge during routine maintenance.
- (C) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

I hereby certify that this plan, specification,
or report was prepared by me or under my
direct supervision and that I am a duly
Licensed Professional Engineer under the
laws of the State of Minnesota.

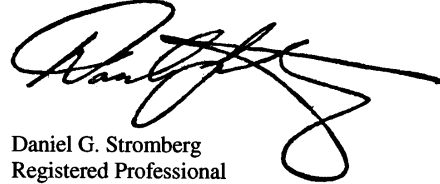
Daniel G. Stromberg



Date 6/30/2004 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.



Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 92052

Feature Crossed: North Fork Crow River

Feature Carried: CSAH No. 19

Location: District 3 – Sterns County

Bridge Description: The superstructure consists of a three span, timber stringer bridge supported by a timber pile center pier and two timber pile abutments.

2. INSPECTION DATA

Professional Engineer/Team Leader: Shirley M. Walker, P.E.

Dive Team: Clayton G. Brookins, Michelle D. Koerbel

Date: September 28, 2002

Weather Conditions: Light Rain, $\pm 45^{\circ}$ F

Underwater Visibility: ± 2 Feet

Waterway Velocity: Negligible/None

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: East and West Abutments and Pier 1

General Shape: The East and West Abutments are constructed of timber piles with timber plank backwalls and wingwalls. The center pier consists of six timber piles braced with diagonal timber plank bracing.

Maximum Water Depth at Substructure Inspected: Approximately 8 Feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pile cap at the downstream end of Pier 1.

Water Surface: The waterline was approximately 7.5 feet below reference.
Assumed Waterline Elevation = 92.5.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 5

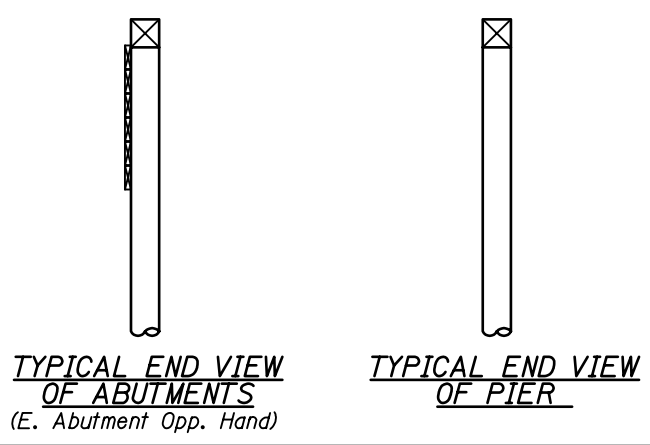
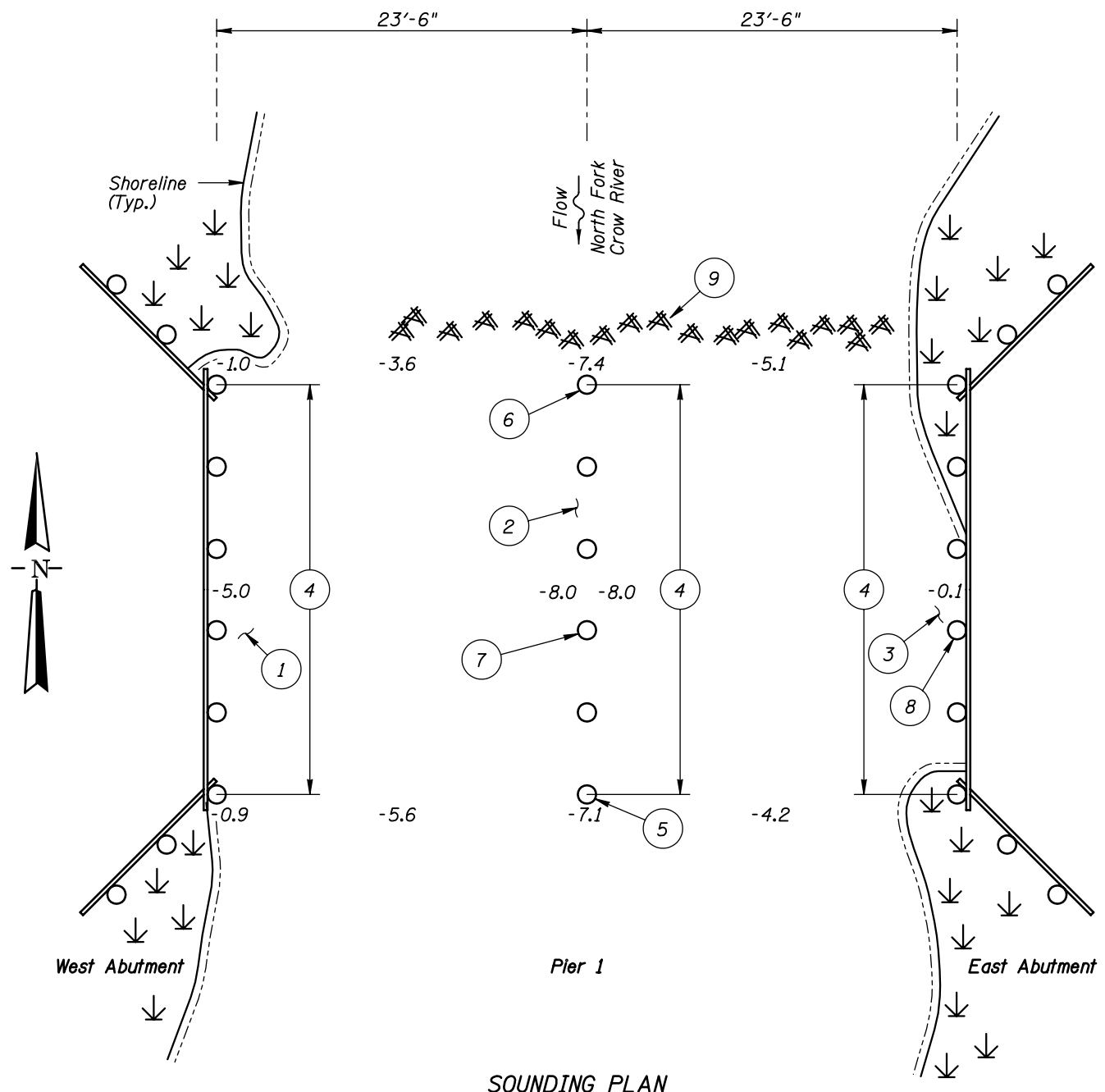
Item 61: Channel and Channel Protection: Code 5

Item 92B: Underwater Inspection: Code B/09/02

Item 113: Scour Critical Bridges: Code U/02

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

_____ Yes X No



GENERAL NOTES:

1. The East and West Abutments and Pier 1 were inspected underwater.
2. At the time of inspection on September 28, 2002 the waterline was located approximately 7.5 feet below the top of the pile cap at the downstream end of Pier 1. Since insufficient bridge elevation information was available a reference elevation of 100.0 was assumed. Based on the assumed reference the waterline elevation was 92.5.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at the mid points between the substructure units.

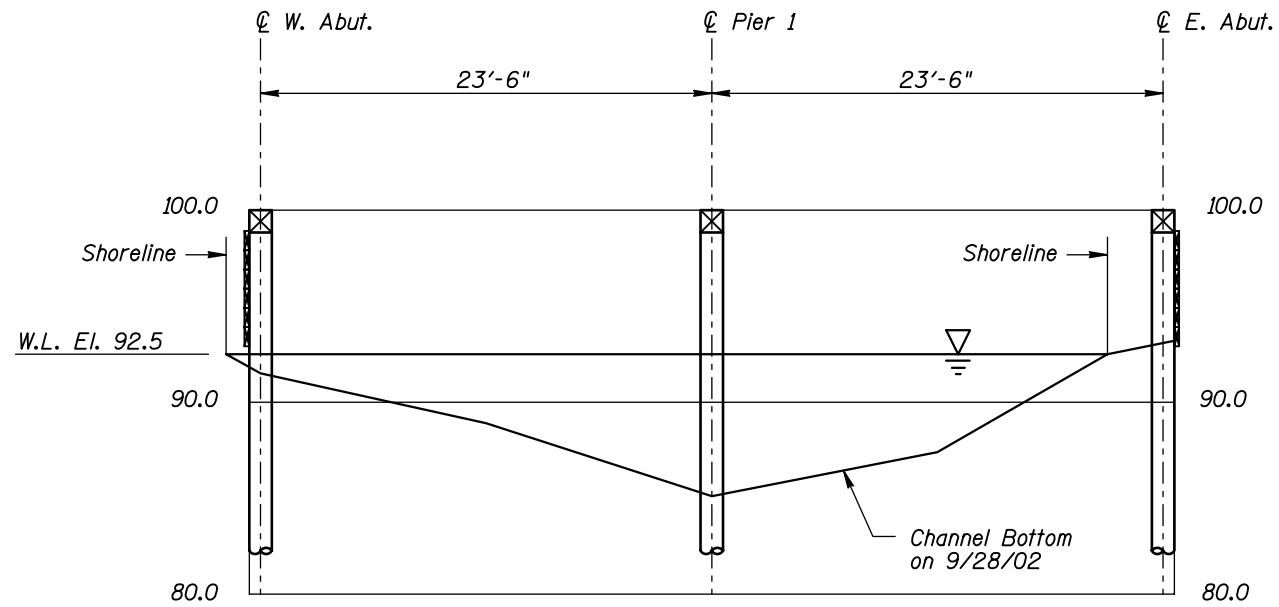
INSPECTION NOTES:

- 1 The channel bottom at the West Abutment consisted of cobbles and silt with up to 6 inches of probe rod penetration.
- 2 The channel bottom at Pier 1 consisted of soft silt with up to 1.5 feet of probe rod penetration.
- 3 The channel bottom at the East Abutment consisted of cobbles and silt with up to 1 foot of probe rod penetration.
- 4 All timber piles exhibited approximately 5 percent section loss near the waterline with up to 1/8 inch wide vertical outer shell cracking extending the full height of the piles with penetrations up to 1/4 inch deep near the waterline.
- 5 The diagonal brace was broken/split below the waterline and was no longer engaged to the downstream pile at the pier. Overall, split was 5 to 6 feet long.
- 6 The diagonal brace was broken below the waterline and was no longer engaged to the upstream pile at the pier.
- 7 The diagonal brace was broken below the waterline and was no longer engaged to the pile at the pier.
- 8 The timber pile exhibited decay, delamination, and outer shell cracking from 2 feet above the waterline to the channel bottom with up to 2 inches of penetration.
- 9 A moderate to heavy accumulation of timber debris, including 2 foot diameter logs, was observed along the entire upstream fascia.

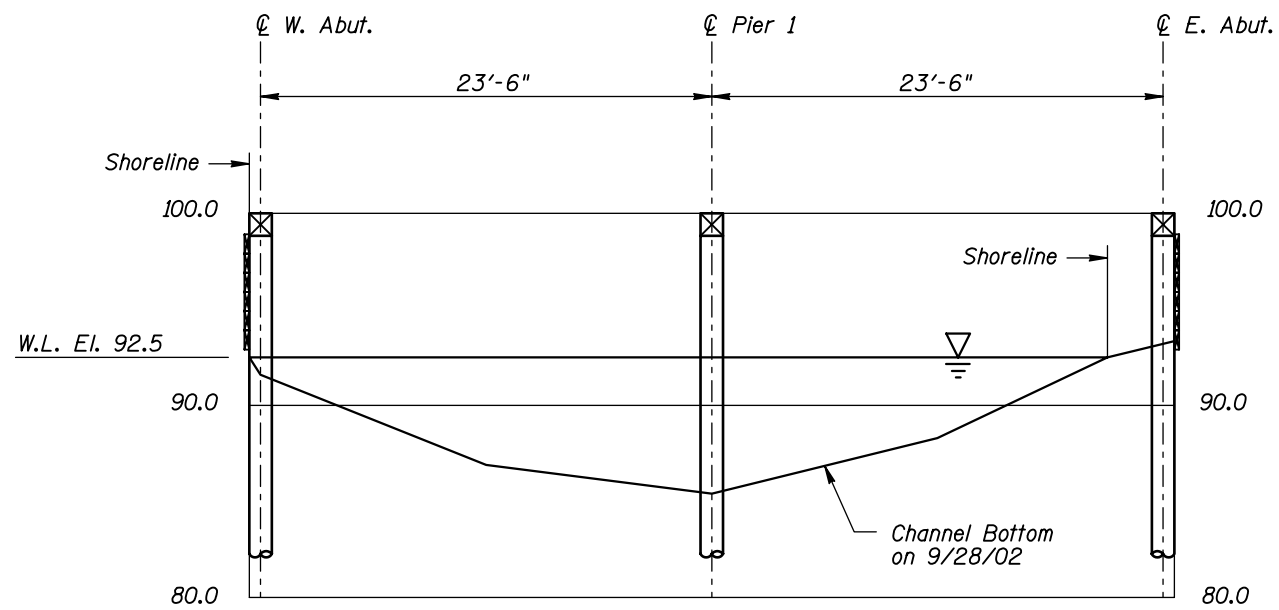
Legend

| | |
|------|---|
| -8.0 | Sounding Depth from Waterline (9/28/02) |
| ○ | Timber Pile |
| ⌵ | Timber Debris |
| ↓ | Grassy Vegetation |

| | | |
|--|--|---|
| MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION | | |
| STRUCTURE NO. 92052 OVER THE NORTH FORK OF THE CROW RIVER DISTRICT 3, STEARNS COUNTY | | |
| INSPECTION AND SOUNDING PLAN | | |
| Drawn By: PRH Checked By: MDK Code: 351292052 | COLLINS ENGINEERS, INC. 300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300 | Date: SEPT. 2002 Scale: NTS Figure No.: 1 |



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:
Refer to Figure 1 for General Notes.

| MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION | | | |
|--|--|------------------|--|
| STRUCTURE NO. 92052 OVER THE NORTH FORK OF THE CROW RIVER DISTRICT 3, STEARNS COUNTY | | | |
| UPSTREAM AND DOWNSTREAM FASCIA PROFILES | | | |
| Drawn By: PRH |  COLLINS ENGINEERS, INC. 300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300 | Date: SEPT. 2002 | |
| Checked By: MDK | | Scale: 1"=10' | |
| Code: 351292052 | | Figure No.: 2 | |



Photograph 1. Overall View of Structure, Looking Northwest.



Photograph 2. Overall View of West Abutment, Looking Northwest.



Photograph 3. Overall View of Pier 1, Looking Southeast.



Photograph 4. View of the Timber Debris at the Upstream Fascia of the Structure, Looking East.



Photograph 5. View of the Broken Brace at the Downstream Pile of Pier 1, Looking West.



Photograph 6. View of the 4th Pile from the Upstream Fascia of the East Abutment, Looking North.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc.

DATE: September 28, 2002

ON-SITE TEAM LEADER: Shirley M. Walker, P.E.

BRIDGE NO: 92052

WEATHER: Light Rain, " 45°F

WATERWAY CROSSED: North Fork Crow River

DIVING OPERATION: X SCUBA SURFACE SUPPLIED AIR
OTHER

PERSONNEL: Clayton G. Brookins, Michelle D. Koerbel

EQUIPMENT: Scuba, U/W Light, Scraper, Sounding Pole, Lead Line, Probe Rod, Camera

TIME IN WATER: 10:00 A.M.

TIME OUT OF WATER: 10:25 A.M.

WATERWAY DATA: VELOCITY Negligible/None

VISIBILITY " 2 feet

DEPTH 8 feet maximum at Pier 1

ELEMENTS INSPECTED: East and West Abutments and Pier 1

REMARKS: Overall, the timber piles and braces of the East and West Abutments and Pier 1 were in satisfactory to fair condition, with up to 1/8 inch wide checks and with 1/8 to 1/4 inches of penetration, extending from the top of the piles down to the mudline on all of the timber piles of the substructure units. Three diagonal braces of the pier were broken and/or split below the waterline at the pile connection. In addition, the fourth pile from the north end of the East Abutment exhibited significant decay of the exterior layer of the pile, which was soft and spongy with approximately 2 inches of penetration. A moderate to heavy accumulation of timber debris was observed extending across the entire upstream fascia of the bridge.

FURTHER ACTION NEEDED: X YES NO

Replace the broken and/or split diagonal braces during future maintenance operations. Monitor the decayed piles at the East Abutment during future inspections, and if found to be progressing, remedial measures may then be warranted.

FURTHER ACTION NEEDED: (CONTINUED)

Remove the moderate accumulation of timber debris from the upstream fascia of the bridge during routine maintenance.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 92052
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Shirley M. Walker, P.E.
WATERWAY CROSSED North Fork Crow River

INSPECTION DATE September 28, 2002

NOTE: USE ALL APPLICABLE CONDITION DEFINITIONS AS DEFINED IN THE MINNESOTA RECORDING AND CODING GUIDE INCLUDING GENERAL, SUBSTRUCTURE, CHANNEL AND PROTECTION, AND CULVERTS AND WALL DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

| UNIT REFERENCE NO. | UNIT DESCRIPTION | MAXIMUM DEPTH OF WATER | SUBSTRUCTURE | | | | | | CHANNEL | | | | | GENERAL | | | | | |
|--------------------|------------------|------------------------|--------------|----------------------------|----------|--------------|-----------------|--------------------------------------|---------|--------------------|-----------------------|----------------------|--|----------|-------|--------|-----------------|--------------------------------|-------|
| | | | PILING | COLUMNS, SHAFTS, OR FACES* | FOOTINGS | DISPLACEMENT | OTHER (BRACING) | OVERALL SUBSTRUCTURE CONDITION CODE* | SCOUR | EMBANKMENT EROSION | EMBANKMENT PROTECTION | OTHER (DRIFT/DEBRIS) | OVERALL CHANNEL & PROTECTION CONDITION | CONCRETE | STEEL | TIMBER | LOSS OF SECTION | PREVIOUS REPAIR OR MAINTENANCE | OTHER |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| | East Abutment | 1.0' | 5 | N | N | 8 | N | 6 | N | 8 | 8 | 5 | 5 | N | N | 5 | 6 | N | N |
| | Pier 1 | 8.0' | 6 | N | N | 8 | 5 | 5 | N | N | N | 5 | 5 | N | N | 5 | 6 | N | N |
| | West Abutment | 5.0' | 6 | N | N | 8 | N | 6 | N | 8 | 8 | 5 | 5 | N | N | 6 | 7 | N | N |
| | | | | | | | | | | | | | | | | | | | |

*UNDERWATER PORTION ONLY

REMARKS: Overall, the timber piles and braces of the East and West Abutments and Pier 1 were in satisfactory to fair condition, with up to 1/8 inch wide checks and with 1/8 to 1/4 inches of penetration, extending from the top of the piles down to the mudline on all of the timber piles of the substructure units. Three diagonal braces of the pier were broken and/or split below the waterline at the pile connection. In addition, the fourth pile from the north end of the East Abutment exhibited significant decay of the exterior layer of the pile, which was soft and spongy with approximately 2 inches of penetration. A moderate to heavy accumulation of timber debris was observed extending across the entire upstream fascia of the bridge.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO. USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.